

Enhancing Industry-Academia Research Collaboration in Philippine Civil Engineering: An Online Survey Exploration

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ABSTRACT

This study investigates the current state of industry-academia research collaboration within the Philippine civil engineering management sector, emphasizing its significance to engineering management practices. Recognizing the essential role such partnerships play in fostering innovation, addressing industry challenges, and improving operational efficiencies, the research explores the key barriers and opportunities for strengthening these collaborations. An online survey was administered to civil engineers from both academia and industry to gather insights into their experiences, perspectives, and perceived challenges regarding joint research activities. The findings reveal that limited time, resources, and a lack of clear research incentives within the industry are substantial impediments to active participation. Institutional misalignment, administrative bottlenecks, and funding constraints further hinder sustained collaboration. Despite these challenges, the study identifies a shared interest among professionals in fostering strategic partnerships, particularly in areas critical to engineering management, such as construction project management, infrastructure sustainability, and technological innovation. The research highlights the need for proactive strategies to bridge the gap between academic research and industry practice. Recommendations include establishing structured engagement platforms, incentivizing collaborative initiatives, and aligning academic outputs with industry needs. This study contributes valuable insights into the field of engineering management by exploring how industry-academia collaboration can improve decision-making processes, resource allocation, and project management within the civil engineering sector. It provides practical recommendations for policymakers, academic leaders, and industry stakeholders, aiming to enhance professional development and the impact of civil engineering practices in the Philippine context.

Keywords: Academe, Civil Engineer, Collaboration, Engineering Management, Research, Research Culture

INTRODUCTION

The integration of digital technologies into the civil engineering industry is crucial for addressing modern infrastructure challenges and ensuring sustainable development. However, a notable gap persists between the research conducted by academic institutions and its practical application within the industry (Dwivedi, Y. K. et al., 2024). This study aims to identify and critically analyze the barriers that hinder effective research collaboration between academic institutions and industry practitioners, with a particular focus on the engineering management aspects within the Philippine civil engineering context.

A central challenge to fostering such collaboration lies in the funding disparities between the two sectors. Academic institutions primarily rely on government grants or internal funds from entities such as the Department of Science and Technology (DOST) or the Commission on Higher Education (CHED), while industry practitioners, especially those in private sector firms, often have limited financial resources or prioritize short-term project outcomes (Daka, H. et al., 2023). This gap in funding restricts the ability to implement joint research projects and effectively translate academic research into actionable industry practices, which is a critical concern from an engineering management perspective.

In addition to financial limitations, the differing priorities and timeframes between academia and industry pose significant barriers to collaboration. Academic research often focuses on theoretical advancements and long-term objectives, while industry practitioners are typically more concerned with immediate, cost-effective solutions that can ensure high returns on investment and operational efficiency. These differing perspectives present challenges in aligning research goals with industry needs, particularly when managing engineering projects that require both innovative solutions and practical applicability (Valentino, A. L., & Juanico, J. F., 2020).

From an engineering management standpoint, these barriers are significant because the management of engineering projects depends not only on technical expertise but also on the ability to integrate new research and innovation into real-world applications. Engineering management, which focuses on the planning, coordination, and execution of engineering projects, requires bridging the gap between research outputs and the practical needs of the industry. Thus, fostering effective collaboration between academia and industry is crucial for ensuring that engineering managers can leverage cutting-edge research to improve practices, enhance decision-making processes, and drive more sustainable and efficient project outcomes.

By understanding the barriers to research collaboration, this study seeks to provide insights into strategies for bridging the gap and fostering more effective partnerships between civil engineering practitioners and academia. Such collaboration is essential for driving innovation, improving industry practices, and addressing the pressing challenges facing the built environment (Joyce, K. E., & Cartwright, N., 2020).

This study contributes to the Philippine civil engineering and engineering management fields by addressing these barriers and exploring ways to enhance collaboration between academia and industry. Specifically, it investigates the challenges unique to the Philippine context and proposes strategies for overcoming these barriers to facilitate the integration of research into industry practice.

This survey study aimed to identify specific barriers to research collaboration between the civil engineers in the industry and in the academe to bridge the gap in integrating the latest technologies in the industry and academe. In many ways, most of those who conduct research activities are coming from the academia where funding was taken either from the government through Department of Science and Technology (DOST) or Commission on Higher Education (CHED) or most likely coming from the fund of the academic institutions. It is known that only few civil engineers are doing research activities in the industry especially if it is a private entity.

Although academic research in civil engineering is often robust, it is predominantly conducted within academic circles, leaving a significant gap in industry participation. This lack of involvement from industry professionals, especially in private sector-led research, creates barriers to integrating innovative technologies and methodologies into actual projects. Without this collaboration, engineering management professionals face challenges in applying the latest research to real-world engineering projects, limiting both innovation and the overall effectiveness of engineering solutions.

The literature on research collaboration highlights these gaps in the Philippine context, where industry involvement in research remains minimal, and the translation of academic innovations into practice is often delayed or inefficient. Several studies (e.g., Makin, S., 2021) have outlined the theoretical challenges, but there remains a lack of focused research examining these issues within the Philippine civil engineering sector. This study fills this gap by offering a critical synthesis of the barriers faced by both sectors, with particular emphasis on how engineering management practices can address these issues. By examining the specific context of the Philippines, this research contributes new insights into how bridging the academic-industry divide can enhance project outcomes, innovation, and the effective management of civil engineering projects.

By examining the perspectives of both academic researchers and civil engineering industry practitioners, this study aims to identify the key barriers to research collaboration and provide insights into how these barriers can be overcome. In doing so, it will contribute to the development of strategies that align research efforts with industry needs, enhancing the practical impact of civil engineering research. These strategies will ultimately foster stronger collaborations that not only benefit academic research but also improve the management of engineering projects, ensuring that new technologies and methodologies can be applied efficiently in the field (Makin, S., 2021).

The convergence of academic research and industry practice is pivotal for advancing knowledge and innovation in the field of civil engineering. Effective collaboration between civil engineering practitioners and the academe can lead to the development of more practical and relevant solutions to pressing civil engineering challenges. Although, numerous barriers often hinder the formation and sustainability of such partnerships. This paper aims to explore and analyze these barriers and determine the workable solutions providing a deeper understanding of the factors that impede collaborative research efforts.

LITERATURE REVIEW

This study examined the barriers and opportunities associated with industry–academia research collaboration within the Philippine civil engineering sector. When situated within established theoretical frameworks and prior empirical research, these results offer deeper insight into the structural and cultural dimensions of collaboration.

The findings may be understood through the lens of the Triple Helix Model, which conceptualizes innovation as an outcome of dynamic interactions among universities, industry, and government (Etzkowitz & Leydesdorff, 2000). It was reported that there is low level of collaborations with government agencies such as DOST, DPWH, and LGUs,. This suggests that the Philippine civil engineering ecosystem has not yet developed a mature, institutionalized Triple Helix configuration.

The concept of Mode 2 knowledge production further explains the limited integration observed in this study. Mode 2 knowledge is transdisciplinary, application-oriented, and socially distributed, emerging through collaboration between researchers and practitioners (Gibbons et al., 1994). The low research participation rate among industry respondents indicates that knowledge production in Philippine civil engineering remains largely Mode 1—discipline-based and academically centered. Moreover, the absence of dedicated research time and compensation reinforces a traditional academic model rather than a co-produced knowledge framework. Without structural mechanisms for joint problem-solving, research outputs struggle to transition into engineering management practice. This confirms earlier arguments that the research–practice gap persists where institutional systems do not incentivize collaborative knowledge generation (Makin, 2021).

The present study aligns with international research on university–industry collaboration. Dwivedi et al. (2024) identified institutional inertia and misaligned incentives as major obstacles to translating academic research into practical outcomes. Similarly, Daka et al. (2023) emphasized funding constraints and structural misalignment between higher education institutions and industry needs. Valentino and Juanico (2020) highlighted practitioner-related barriers such as limited time, insufficient funding, and differing organizational motivations. However, this study extends prior research by situating these barriers specifically within the Philippine civil engineering management sector. The particularly low research engagement in private industry and minimal research dissemination reveals a weaker research culture compared to more developed innovative ecosystems. This contextual specificity strengthens the empirical contribution of the study.

METHODOLOGY

Data Gathering and Analysis

The researchers conducted an online survey involving the civil engineers working in the academe and industry during March-April 2025. The survey was distributed online using Google Forms within a duration of one (1) month. Only those who had responded to the survey were included in the survey study.

The respondents and sampling

This study surveyed a total of 130 respondents, comprising both academic professionals and industry practitioners within the civil engineering field. A convenience sampling method was employed, where the survey link was distributed through emails and social media platforms to reach a broad range of potential participants. To allow adequate time for responses, the researchers set a one-month period for respondents to complete the questionnaires. Only those who voluntarily participated in the survey were included in the analysis.

Although the sample size is limited, the responses gathered provide valuable insights into the barriers to research collaboration between academia and industry in the Philippine civil engineering context. These findings can be extrapolated to inform engineering management practices, particularly in relation to improving the integration of academic research into practical industry applications. This study thus contributes to engineering management by identifying key challenges and opportunities for enhancing collaboration, which is essential for optimizing project outcomes, innovation, and the overall management of civil engineering practices.

The Research Instrument

A survey questionnaire was deployed to the respondents which was patterned from the study of Valentino and Juanico (2020). Minor modifications were made to fit with the purpose of the current study. The questionnaire was divided into five (5) parts, the profile of the respondents, opportunities to conduct research, opportunities for research collaboration, barriers on research collaboration, and proposed solutions to problems encountered in research collaboration. In terms of the barriers on research collaboration, the barriers cited were based on the previous research that already identified some of the barriers in research collaboration.

Scoring and interpretation

To answer the objectives on determining the barriers on research collaboration, and proposed solutions to problems encountered in research collaboration, the 4-Likert scale was used, one (1) as the lowest and four (4) as the highest score from strongly agree, agree, disagree and strongly disagree.

The weighted mean for each of the items in the questionnaire is interpreted based on the criteria shown in Exhibit 1.

Exhibit 1. Interpretation Table

Weighted Mean	Interpretation
1.00 – 1.50	Strongly Disagree
1.51 – 2.50	Disagree
2.51 – 3.50	Agree
3.51 – 4.00	Strongly Agree

RESULTS AND DISCUSSION

Respondents' Profile

Exhibit 2 presents the respondent's profile on sex and nature of the company they are working, type of company and number of research conducted. In terms of sex, majority of the respondents are male, majority are working in the private industry. As regards to the number of research conducted, a significant majority (55.38%) of respondents (72 out of 130) indicated no prior research experience. Only 58 out of 130 respondents had already conducted research activities.

Exhibit 2. Respondent's Profile

Profile	Industry CEs		Academe CEs	
	No.	%	No.	%
Sex				
Male	51	62.96	38	77.55
Female	30	37.04	11	22.45

Total	81	100	49	100
Nature of Company				
Academe	16	19.75	15	30.61
Industry	65	80.25	34	69.39
Total	81	100	49	100
Number of Research Conducted				
None	56	69.14	16	32.65
1 - 10	23	28.40	26	53.06
11 - 20	0	0.00	4	8.16
21 - 30	0	0.00	1	2.04
Above 30	2	2.47	2	4.08
Total	81	100	49	100

Opportunities to Conduct Research

Exhibit 3 presents the respondents opportunities to conduct research. The table reveals that 69 or 85.19% of the industry respondents does not have research activity in their company, while only 12 or 14.812% do have. Out of the 69 respondents that have conducted research, only 7 or 10.15% presented their paper in a conference and 6 or 8.70% published their paper in a journal.

For both from the academe and industry, 79 or 60.77% of the respondents said that their organization did not provide a specific time for them to conduct research activities. 96 or 73.85% of the total respondents confirmed that their organization does not provide additional compensation to research work. Majority or 74.62% of the respondents have shown interest in conducting and publishing research works.

Most respondents reported minimal engagement in research activities within their organizations, suggesting a potential lack of a robust research culture or supportive infrastructure. The low percentage of respondents who have presented their research at conferences or published in academic journals further emphasizes the limited emphasis on research dissemination and scholarly engagement.

Additionally, the absence of supplementary compensation for research-related work may function as a deterrent, particularly when employees are required to invest additional time and effort without adequate incentives.

Despite these challenges, a considerable number of respondents expressed a keen interest in engaging in research and publishing their findings, indicating a latent demand for research opportunities and organizational support. This underscores a potential opportunity for organizations to foster a more research-oriented environment.

From an engineering management perspective, these findings highlight the critical role of leadership in cultivating a research-driven culture. By addressing these gaps, such as providing proper incentives, establishing dedicated research time, and fostering institutional support for dissemination, organizations can enhance innovation, strengthen their competitive edge, and improve employee engagement.

Engineering management practices must emphasize the integration of research into the organization's strategic objectives, aligning resources and policies to promote continuous learning, technological advancement, and industry leadership.

Exhibit 3. Opportunities to Conduct Research

1. Have you conducted Research?	Industry CEs		Academe CEs	
	No.	%	No.	%
YES	12	14.81%	31	63.27%
NO	69	85.19%	18	36.73%
Total	81	100%	49	100%
2. If YES, have you presented your research paper in any conference?				
YES	7	58.33%	26	83.87%
NO	5	41.67%	5	16.13%
Total	12	100%	31	100%
3. Have you published your research paper in any journal?				
YES	6	50.00%	24	77.42%
NO	6	50.00%	7	22.58%
Total	12	100%	31	100%
4. Does your organization provide specific time for you to conduct research?				
YES	18	22.22%	33	67.35%
NO	63	77.78%	16	32.65%
Total	81	100%	49	100%
5. Does your organization provide compensation when conducting research?				
YES	5	6.17%	20	40.82%
NO	76	93.83%	29	59.18%
Total	81	100%	49	100%
6. Does your organization provide its employees opportunities to conduct research?				
YES	28	34.57%	9	18.37%
NO	53	65.43%	40	81.63%
Total	81	100%	49	100%
7. Are you interested in presenting research at a conference?				
YES	50	61.73%	47	95.92%
NO	31	38.27%	2	4.08%

Total	81	100%	49	100%
8. Are you interested in publishing?	No.	%	No.	%
YES	51	62.96%	47	95.92%
NO	30	37.04%	2	4.08%
Total	81	100%	49	100%

Opportunities for Research Collaboration

Exhibit 4 shows the opportunities for research collaboration. The table reveals that only 24 or 18.46% had responded that they had conducted research collaborations and majority of 81.54% does not have any research collaboration activities. The same table shows that among those who have collaborations, it is the private school institutions rank the first with a count of 10 or 41.67%. Other institutions that the respondents have collaboration with are, private industry, DOST, DPWH, State University and Local Government Units (LGU).

Most respondents reported having no research collaboration activities. This suggests that there is a significant gap in collaborative research endeavors, which can limit the scope and impact of research projects. Among those who have engaged in research collaborations, private schools emerged as the most active participants. This could indicate that private schools may have more resources, flexibility, or incentives to engage in collaborative research compared to other institutions.

The presence of collaborations with public agencies like DOST, DPWH, and LGUs highlights the potential for fruitful partnerships between academic institutions and government entities. These collaborations can contribute to addressing societal challenges and informing public policy. The low rate of research collaboration suggests that there is ample room for growth in this area. Encouraging and facilitating collaborations between institutions can lead to more innovative research, shared resources, and a broader dissemination of knowledge.

Exhibit 4. Opportunities for Research Collaboration

1. Have you conducted a research collaboration?	Number	Percentage
YES	24	18.46
NO	106	81.54
Total	130	100.00
2. What organization/company, outside of your own, you have collaboration with?		
DOST	3	12.50
DPWH BRS	2	8.33
Private Schools Collaboration	10	41.67
State University	2	8.33

LGU	1	4.17
Private Industry	6	25.00
Total	24	100.00

Barriers in Research Collaboration

Exhibit 5 summarizes the perceived barriers to research collaboration among civil engineers. Item 1 “Lack of time to undertake collaboration” got the highest weighted mean of 3.48 interpreted as “agree” while Item 15

“Different mode and language of communication” got the lowest weighted mean of 2.49 interpreted as “agree”. Overall, the respondents' assessments indicate a general agreement with the presence of barriers to collaboration. These findings underscore the challenges faced by civil engineers in dedicating sufficient time to collaborative research initiatives. The time constraints imposed by their professional responsibilities within their respective companies contribute to this obstacle. Consequently, limited opportunities for collaborative research may hinder the advancement of knowledge and innovation in the field of civil engineering."

Exhibit 5. Barriers in Research Collaboration

Barriers in Research Collaboration	Mean	Interpretation
1. Lack of time to undertake collaboration	3.48	Agree
2. Lack of financial resources to undertake collaboration	3.42	Agree
3. Lack of awareness of benefits of collaboration	3.02	Agree
4. Different motivations between university and industry	3.31	Agree
5. Confidentiality concerns	2.83	Agree
6. Bureaucracy within the university/industry	2.93	Agree
7. Companies lack awareness of university's/industry's activities	3.02	Agree
8. Differing time horizons for projects	3.03	Agree
9. Companies' fear of disclosure of business knowledge/IP	2.95	Agree
10. Difficulty in locating appropriate industry partner	3.03	Agree
11. Industry not interested in publishing results	3.10	Agree
12. Lack of single point of contact in companies/universities	2.97	Agree
13. Lack of staff in companies with appropriate academic expertise	3.08	Agree
14. Lack of staff in the university with industrial expertise	2.97	Agree
15. Different mode and language of communication	2.49	Agree

Proposed Solutions to the Problems Encountered in Research Collaboration

Exhibit 6 outlines the proposed solutions to the challenges faced in research collaboration. The table reveals that item 5 “Provision of funding, incentives, and rewards as well as motivating participants” got the highest weighted

mean of 2.92 interpreted as “agree” while items 1 “Competent leadership and management”, item 7 “Optimal team size and composition” and item 8 “Working with partners with similar styles of working and objectives” got the lowest weighted mean of 2.80 interpreted as “agree”. Overall, respondents expressed general agreement with the proposed solutions.

These findings highlight the importance of providing adequate resources and motivation to encourage effective research collaboration. By offering funding, incentives, and rewards, organizations can create a more conducive environment for researchers to engage in collaborative projects. Additionally, addressing factors such as leadership, team dynamics, and partner compatibility can contribute to successful collaborations.

Exhibit 6. Proposed Solutions to the Problems Encountered in Research Collaboration

Proposed Solutions to the Problems Encountered in Research Collaboration	Mean	Interpretation
1. Competent leadership and management	2.80	Agree
2. Development of a research program that integrates the interests and competencies of all participants	2.88	Agree
3. Effective and continuous communication, negotiation, and networking	2.82	Agree
4. Fostering commitment, trust, and a good relationship between collaborators	2.82	Agree
5. Provision of funding, incentives, and rewards as well as motivating participants	2.92	Agree
6. Working with previous collaboration partners	2.85	Agree
7. Optimal team size and composition	2.80	Agree
8. Working with partners with similar styles of working and objectives	2.80	Agree
9. Continuous evaluation of collaboration, including the detection of conflicts or problems	2.85	Agree

CONCLUSIONS AND RECOMMENDATIONS

This study aimed to identify specific barriers to research collaboration between civil engineers in industry and academia, with the goal of bridging the gap in integrating the latest technologies between these sectors. An online survey was conducted with 130 civil engineers, drawn from both academia and industry, between March and April 2025. Regarding the respondents' profile, the majority were male, with a predominance from the private industry, and a notable number of respondents indicated no prior research experience.

Among those with research experience, only a small fraction had presented or published their research outputs. The findings reveal that most companies do not allocate specific time for research activities and do not offer additional compensation for research efforts. Despite the lack of research incentives, a significant portion of respondents expressed interest in conducting and publishing research. This suggests a potential lack of research culture and supportive infrastructure within the organization. The absence of adequate compensation and time for research may discourage employees from pursuing research activities, especially when these efforts require extra time or effort.

From an engineering management perspective, these findings highlight the importance of creating a conducive environment for research and innovation. Companies and academic institutions alike must recognize the value

of integrating research into their operational frameworks. Engineering management practices should focus on facilitating the alignment of industry goals with academic advancements. Specifically, organizations must establish policies that incorporate research into their strategic objectives, providing the necessary resources, dedicated time, and financial support to foster a thriving research culture.

The study also underscores the challenges civil engineers face in dedicating sufficient time to collaborative research initiatives due to time constraints imposed by their professional duties. This barrier may be further exacerbated by a lack of structured incentives and support from management.

The respondents expressed general agreement with the proposed solutions, highlighting the need for enhanced resources and motivation to drive effective research collaboration. In light of this, it is recommended that organizations offer targeted funding, incentives, and rewards for research initiatives, thus promoting collaboration and advancing innovation. Engineering management should prioritize the creation of an environment that supports collaborative research through flexible work arrangements, access to necessary resources, and, most importantly, dedicated time for research activities. Moreover, leadership should play a crucial role in fostering a culture of collaboration by addressing factors such as team dynamics, partner compatibility, and organizational support systems.

By addressing these recommendations, organizations can enhance their research capabilities, drive innovation, and ultimately improve their competitiveness within the industry.

AI in Technical Writing

During the preparation of this work, the authors used CHATGPT to improve the narrative and check the grammar. After using this tool/service, the authors reviewed and edited the content as needed and take(s) full responsibility for the content of the publication. AI and AI-assisted technologies were not used to perform authorship tasks or other tasks that can only be attributed to and performed by humans.

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